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Ministry of Education
Ontario

The Hon. Bette Stephenson, M.D.
Minister

Curriculum Ideas for Teachers

1979

Government Publications

History and Geography Intermediate Division

Research Study Skills

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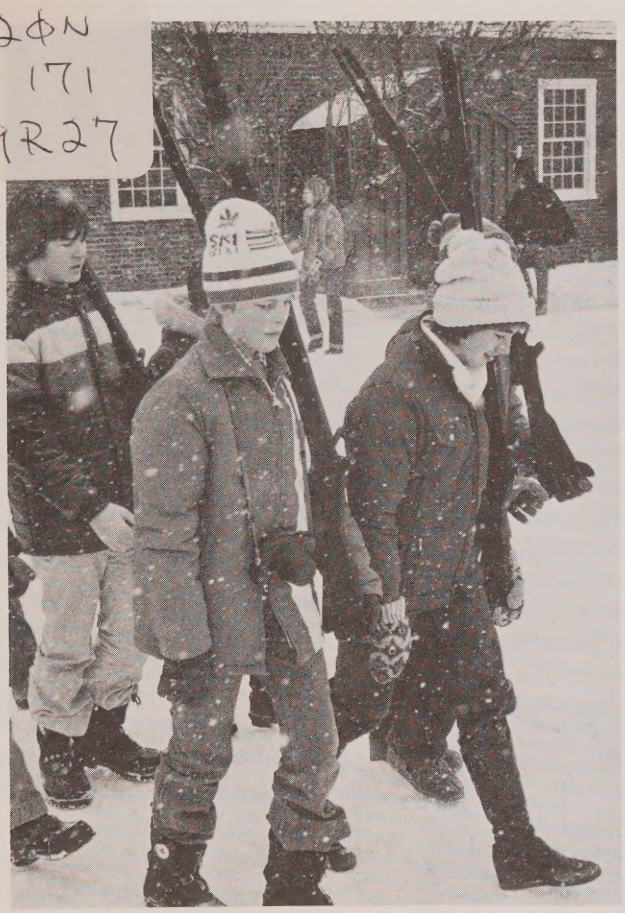

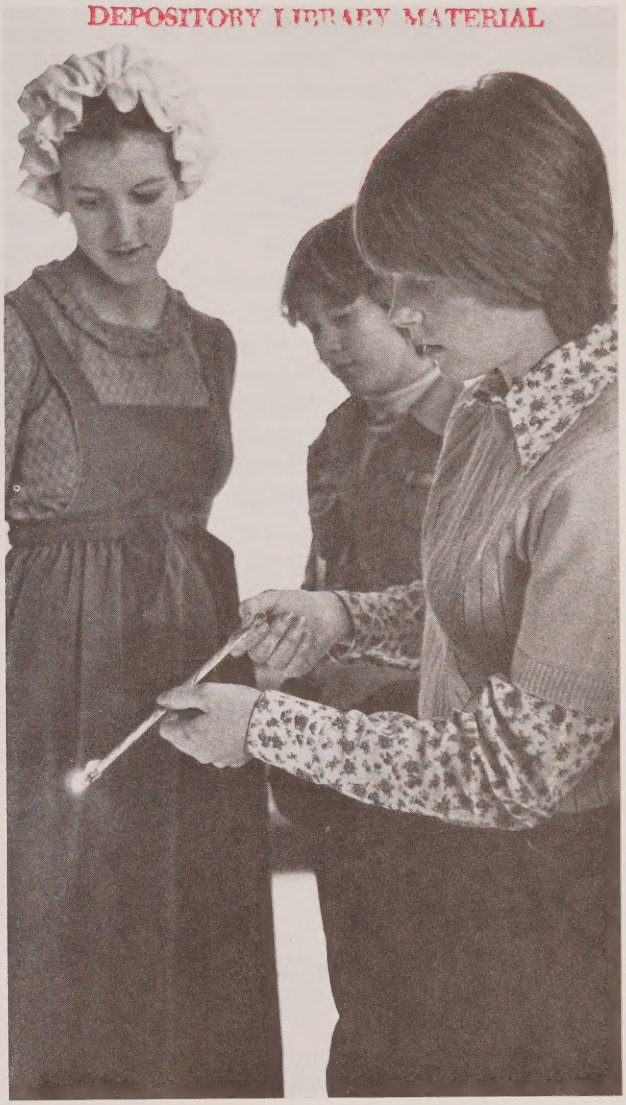

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Introduction

The Research Study Skills procedure has been designed to provide students with a framework that will assist them in their investigation of historical and geographical questions and issues. Other formulations of research methods exist, but this model has an important advantage: it presents an organized, overall picture of the research activity instead of simply listing a series of research skills. While the procedure outlined provides the basis for research and writing in history and geography, the research methodology does not apply exclusively to the study of these subjects. Because the procedure is similar in many respects to that employed in other disciplines, students will be able to apply it in these other areas. Teachers' efforts in various school subjects can therefore reinforce and complement each other. In addition, since the major steps in the procedure can be applied to inquiries and research at all grade levels, and since each step encompasses a range of skills, it can provide a continuum from grade to grade and from division to division. It is also applicable to the resolution of problems and issues in everyday situations.

The aims listed in the history guideline for the Intermediate Division emphasize the importance of research activity. They include the following:

- to develop the ability to distinguish fact from opinion, to detect bias, to formulate a hypothesis, to evaluate and interpret evidence, to draw conclusions based on evidence, to synthesize, to speculate, to make judgements;
- to develop an awareness of values and of value alternatives;
- to develop research skills, including library skills, interviewing skills, and the ability to draw and select information from non-print as well as print resources; . . .

From *History, Intermediate Division, 1977,* p. 6.

These aims include not only the traditional library research skills, but also other inquiry skills associated with the investigation of issues. For example, one of the general objectives for the area of investigation entitled "Contemporary Canadian and World Concerns" is "to analyse in historical perspective and in terms of future implications contemporary issues of concern to Canadians both as citizens of Canada and of the world community".

The geography guideline for the Intermediate Division devotes a whole section to "The Nature of Studies in Geography", which is applicable to all of the courses in the Intermediate Division. Particular emphasis is placed on *communication skills,* including:

- locating, organizing, using, and evaluating information;
- communicating with others;
- group skills;
- individual research skills;

and on *attitudes and values:*

Given the opportunity to examine relevant facts and evaluate diverse viewpoints in a supportive classroom climate, they [the students] will be better able to determine what considerations should govern their own behaviour, both now and in the future.

From *Geography, Intermediate Division, 1977,* p. 43.

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The use of this model in the development of a topic, as demonstrated on pages 21 to 24, would allow students to practise these more general skills while acquiring very specific geographic knowledge and skills.

Teachers who assist students with such tasks must develop a clear conception of the research procedure. The Research Study Skills procedure provides a structured framework which will help students to recognize, understand, and analyse contemporary and historical issues. Teachers can also use the approach as a framework for designing units of study.

Teachers must keep in mind the range of student ability in any class and must be cautious when making assumptions. They should carefully consider:

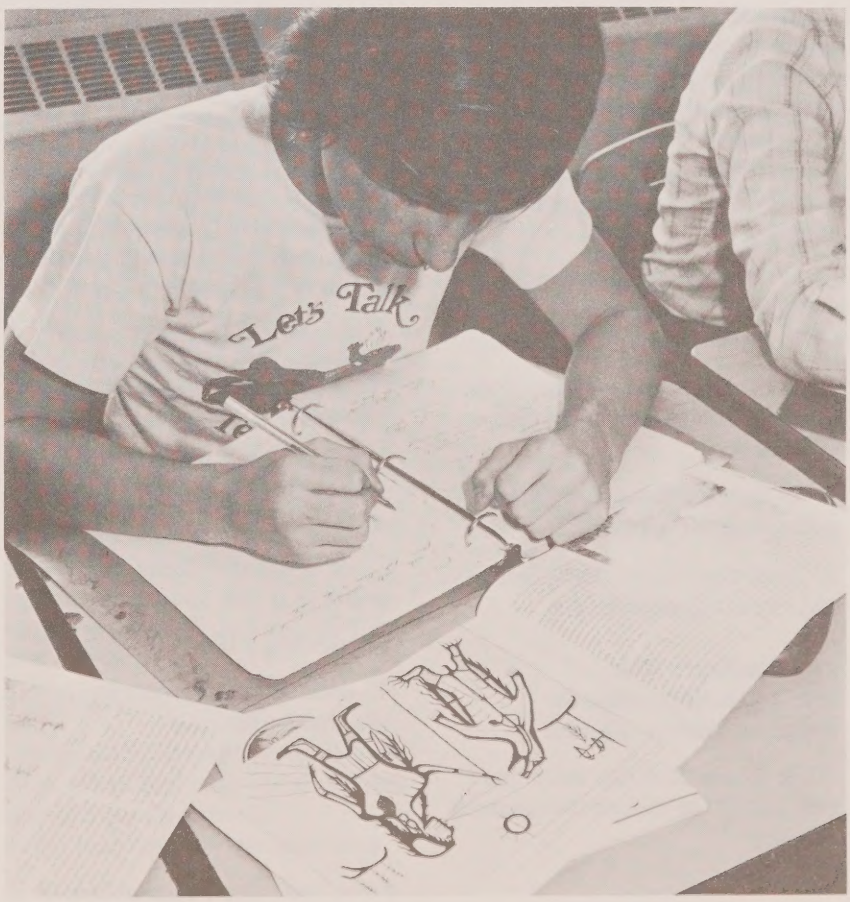
- how well students have developed general skills;
- how well they will respond as individuals or as group members;
- how well they will react in a given learning situation.

To assist the teacher in accommodating a wide range of abilities within one program, techniques suitable to varying levels of skills are described for each step in the Research Study Skills procedure. Appropriate activities can therefore be found for all students in any research project chosen by the teacher.

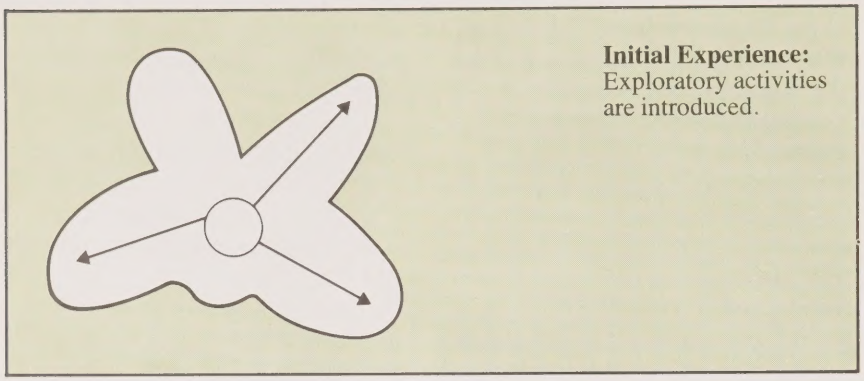
Often the most difficult task faced by a teacher is the introduction of a research approach to students who are not familiar with an organized, structured method of dealing with issues or problems. In such instances, the teacher might begin by setting the class a specific problem or issue and selecting a single question related to that issue. The class as a group proposes alternative solutions to the problem and can then divide into working groups to pursue the various alternatives. Once the groups have collected all relevant data from various sources, the class can reconvene to synthesize the data and draw appropriate conclusions. The students can then make decisions concerning the most effective means of expressing their findings and, finally, evaluate their application of the research procedure. When the teacher feels confident that the students are able to cope comfortably with the basic procedure, he/she can encourage groups of students to pursue a wider-ranging study of an issue or problem. As the students gain competence, the teacher can encourage a greater degree of individual effort.

All of the research skills cannot be introduced in any one school year. However, since the Research Study Skills procedure applies at all grade levels, teachers at each level can share in the responsibility of creating a program that will provide students with the full range of skills as they progress through the grades. Thus, in local program planning, teacher co-operation in skills development across the divisions, and across the grades within the divisions, should be discussed, and decisions made concerning the implementation of this shared responsibility. Progressive growth in research ability can thus be encouraged throughout a student's school career.

The Research Study Skills procedure is outlined on the following pages. Each stage of the basic inquiry model and its corresponding skills are set out on a separate page. A diagram of the model, highlighting the stage under discussion, appears at the top of the page. The role of the teacher and the student skills relevant to that stage of the model are described below the diagram.



The Basic Inquiry Model



Initial Experience: Exploratory activities are introduced.

Initial Experience

Exploratory skills should be developed in the course of the student's initial experience with a topic. Students should learn:

1. to observe with increasing precision and comprehensiveness. This involves:

a) identifying the characteristics of an object or an event by determining: (i) whether the object or event has one characteristic or several; and (ii) which characteristics are dominant and which are minor;
b) identifying the particular characteristics in an object or event by considering (i) just one object or event; (ii) many objects or events;
c) planning observation activities in advance;

2. to differentiate between:
a) the known and the unknown;
b) the familiar and the unfamiliar;

3. to recognize discrepancies and apparent contradictions in the information;

4. to describe these discrepancies and apparent contradictions;

5. to abstract main ideas, feelings, etc., from the experience.

The Teacher's Role
When selecting a topic for research, teachers should:

1. be prepared to use more than one method to initiate the research activity;

2. be prepared for the student who is ready to proceed without further motivation;

3. remember that different approaches appeal to different students.

Teachers guide the student researchers in their explorations of a topic by:

1. observing the students at work;

2. posing questions that help the students to use their skills in listening, observing, and reading;

3. providing for an interplay of ideas among students, and between student and teacher.

By employing these procedures, the teacher will be able to judge which of the following skills to emphasize with a particular child and/or in a particular project.

Student Activities
The students might initiate their research activity by:

1. listening to a record (music, a song, a story, a legend, poetry, etc.);

2. bringing and displaying an object (e.g., an unusual artifact);

3. viewing a film;

4. conducting an interview (e.g., of a local politician);

5. observing a special day (e.g., Thanksgiving Day, Remembrance Day);

6. participating in simulation activities;

7. pursuing a special interest (e.g., stamp collecting);

8. watching a TV show;

9. listening to a radio program (e.g., "Impressions of an Era");

10. examining pictures;

11. investigating contradictory interpretations of an event (e.g., through a document study);

12. reading a story;

13. participating in a field trip.

Student Skills
The purpose of this stage is to assist students:

1. to observe with increasing precision and comprehension when:

a) identifying the characteristics of an object or event;
b) classifying the characteristics of a particular object or event;
c) predetermining a set of characteristics and searching for objects or events that exhibit these characteristics;

2. to differentiate* between:

a) the known and the unknown;
b) the familiar and the unfamiliar;

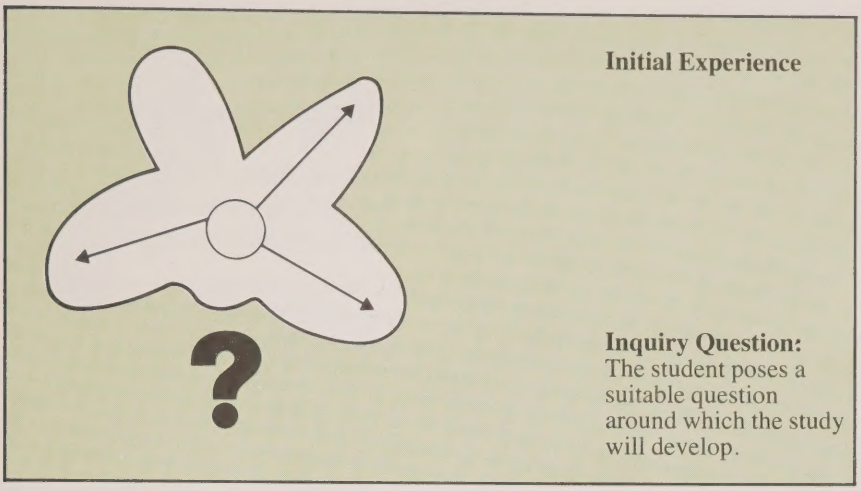
3. to search for significant discrepancies and contradictions in the experience;

4. to describe these discrepancies and contradictions;

5. to abstract the main idea, details, feelings, etc., from the experience.

*The ability to differentiate is important when formulating the questions to be researched. The unknown, the unfamiliar, and inconsistencies arising from the initial situation are areas to be explored.

The Basic Inquiry Model



The Inquiry Question

A variety of skills is necessary to formulate an ''inquiry question'' which clarifies and focuses on the essential issue. Students should be able:

1. to make use of all their senses to explore situations and experiences and be able to formulate questions based on these situations and experiences;

2. to ask specific questions concerning the situation or experience;

3. to distinguish between questions that focus on the topic and those that diverge from it;

4. to recognize the criteria for a good inquiry question;

5. to identify questions that meet the criteria;

6. to create questions that meet the criteria;

7. to reformulate questions that do not meet the criteria;

8. to decide which question is to be researched;

9. to recognize the value of the ability to formulate questions.

The Teacher's Role

The teacher's two-fold task is:

1. to encourage an open atmosphere in which students feel free to pose questions and discuss issues that are significant to them;

2. to help students formulate effective questions. Some of the initial questions may have immediate answers, but can nevertheless be used to develop broader research questions.

Student Skills

The purpose of the question stage is to help students develop the ability:

1. to pose specific questions in situations and experiences involving their senses;

2. to recognize and develop the criteria for formulating an inquiry question. For example, good research questions:

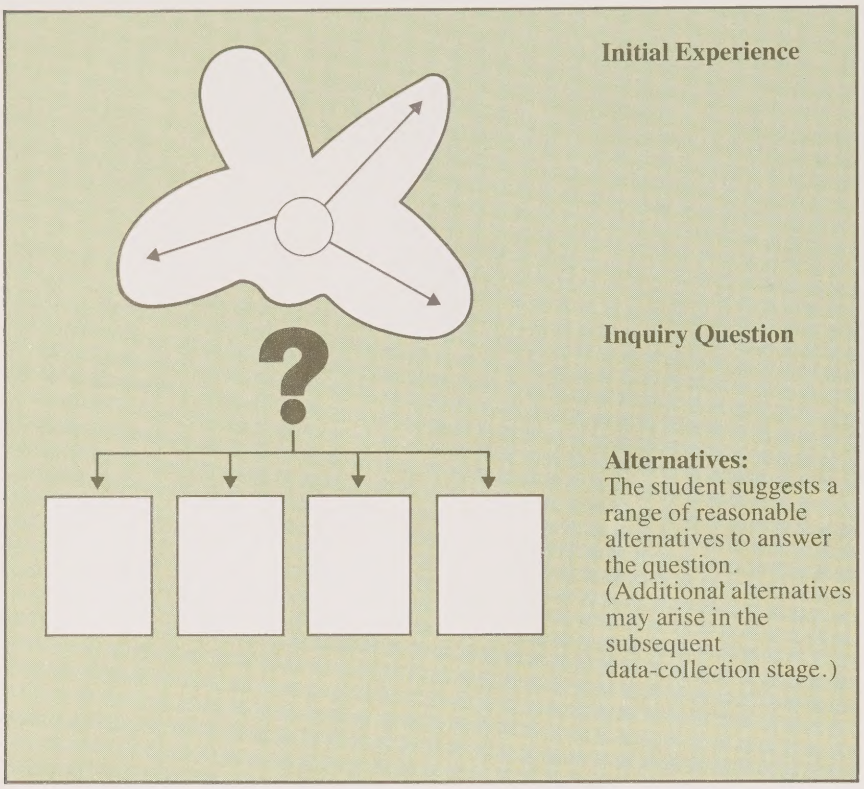
a) are open-ended, admitting the possibility of several answers;
b) demand the use of facts to support or reject the possible answers;
c) are manageable in terms of time and resources;

3. to use these criteria:

a) to identify appropriate questions;
b) to reformulate any questions that do not meet the criteria;
c) to create appropriate questions;

4. to decide which questions are to be researched.

The Basic Inquiry Model



Alternatives

Students require certain skills and attitudes if they are to produce a comprehensive set of alternative solutions that can guide them in their search for information. At this stage students should:

1. be open to a number of possible solutions;

2. recognize different viewpoints by developing:

a) the ability to listen attentively and critically;
b) group discussion skills;
c) the ability to accept criticism;
d) the ability to challenge another viewpoint constructively;
e) the ability to risk the statement of novel ideas;

3. be able to suggest a variety of possible solutions to a question;

4. be able to select the most feasible alternatives from the solutions advanced;

5. be able to recognize further possibilities for solutions if and when they arise during the later stage of data collection.

The Teacher's Role

At this stage of the procedure, the teacher should:

1. promote open-mindedness and accept a wide range of proposed alternatives (i.e., when the class is brainstorming, all suggestions offered by the students should be accepted equally, without the teacher imposing judgement on the ideas);

2. recognize that the search for possible solutions will continue into the data-collection stage;

3. be aware of and assist students in the development of participation skills. Students should be learning to:

a) listen attentively;
b) contribute to group discussion;
c) accept criticism;
d) challenge other viewpoints constructively;
e) risk the statement of novel ideas.

Student Skills

The purpose of the alternatives stage is to assist students:

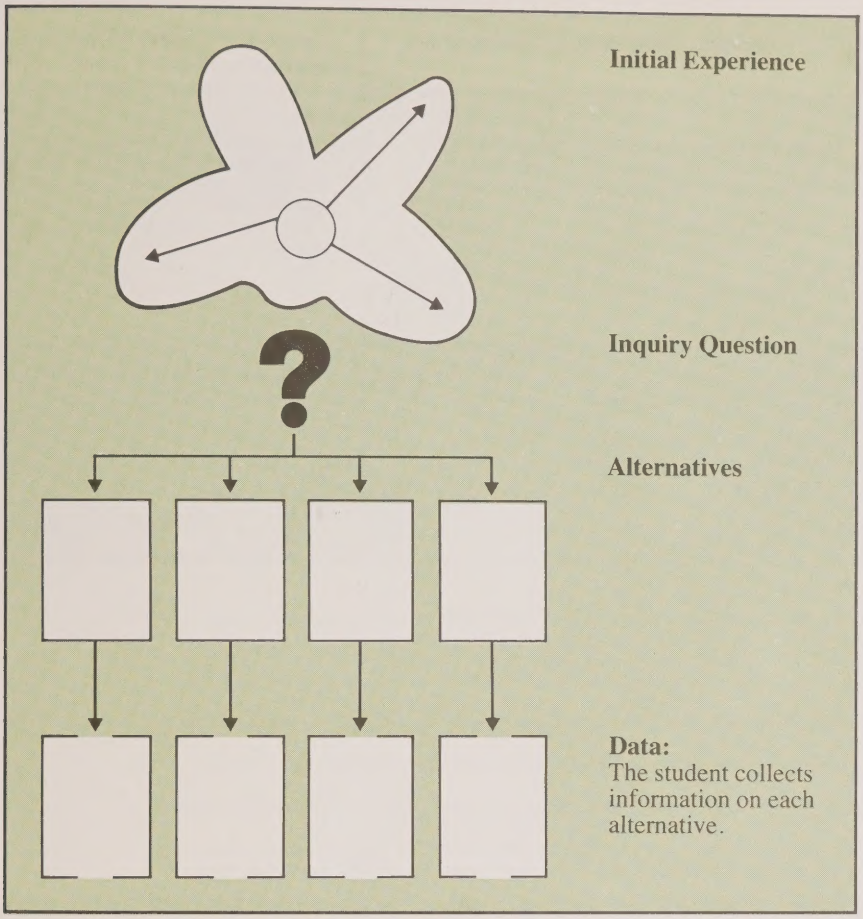
1. to consider and list as great a range of alternatives to the question under consideration as possible. They should be learning:

a) to participate in group activities;
b) to identify cause-and-effect relationships;
c) to tolerate criticism;
d) to challenge other viewpoints constructively;
e) to risk the statement of an unpopular, untried, or unusual solution;

2. to select all relevant alternatives for research;

3. to be aware that additional alternatives may arise during the data-collection stage.

The Basic Inquiry Model



Data Collection

Students must draw on a wide range of skills to become proficient in the collection of data from available sources. They should learn:

1. to recognize from the nature of the question(s) the direction to be taken in the collection of data;

2. to employ a wide range of skills in gathering data, such as:

a) the ability to locate desired information;
b) the ability to collect information;
c) library skills;
d) interviewing skills;
e) data-interpretation skills;

3. to make predictions and to form tentative conclusions throughout the data-collection stage, prior to making final conclusions after all the information has been accumulated.

The Teacher's Role

The teacher should:

1. ensure that students acquire the necessary skills for the collection of data;

2. ensure that students collect all their data before planning the next stage of their research;

3. help students distinguish (from the nature of the question) the appropriate directions for inquiry;

4. assist students to select, from all the possible approaches (e.g., library search, interview, analysis of statistics) the data-collecting procedures that are most applicable to the question;

5. assist students in applying the data-collection procedures they have chosen to their material;

6. help students recognize that during the process of data collection they may change their viewpoints as the information is examined;

7. encourage critical evaluation of the data so that students can make ongoing predictions and formulate opinions that reflect the new information.

Student Skills

The students should learn:

1. to decide from the nature of the question what direction(s) is (are) appropriate for their research;

2. to realize that data collection must be more than an amassing of factual material, and that it involves the critical examination of the data, which may lead to a change in viewpoint, reflecting the ongoing formation of new concepts;

3. to assess critically the value of all of the data before integrating them into the solution;

4. to alter their viewpoint if the data collected should require it;

5. to demonstrate increasing mastery of data-collection skills (see the data-collection chart on pages 8 to 11).

Data-Collection Chart

Basic Skills	Reading – Books, Magazines, Newspapers, Pamphlets, etc.	Viewing – Films, Videotapes, Slides, etc.
1. Finding the main idea a) in the introductory section b) in the summary c) in the middle section(s) d) when not directly stated	This involves: – recognizing that in every sentence and paragraph there is a main idea; – recognizing indicators of the main idea (i.e., capitals, key words, italics, titles, headings, introductory statements, summary statements, etc.); – selecting the main idea from the material read.	This involves: – recognizing that each has a main idea; – recognizing indicators of the main idea (i.e., the significance of the titles, location, opening sequence, etc.); – selecting the main idea from the material viewed.
2. Finding specific details a) related to and supporting the main idea b) to justify the judgements and conclusions made	This involves: – applying efficient reading skills, including skimming and scanning, to locate relevant details; – posing questions to elicit supporting information; – separating relevant from irrelevant details by evaluating them in relation to the main idea.	This involves applying efficient viewing skills to locate relevant details.
3. Identifying relationships a) time b) sequence c) place d) cause-effect e) whole-part f) space	This involves: – locating events and personalities in time; judging the significance of change and the passage of time; – placing events in sequence; – describing relationships among places and among personalities, time, places, and events; – identifying relationships among places and among personalities, time, places, and events; – identifying relationships of cause and effect among events or spatial phenomena; – identifying the relationship of the whole to the parts, the parts to each other, and the parts to the whole; – identifying relationships among objects, etc., in spatial arrangements; – identifying the effect of spatial context in the perception of an object.	
4. Following directions	This involves: – reading an entire set of directions and comprehending its general objective; – determining the meaning of words and illustrations not immediately understood, through the recognition of contextual clues, the use of a dictionary, etc; – translating abstract ideas into concrete form; – discussing the reasons behind the indicated sequence; – arranging the steps in a logical sequence when following and creating directions; – recognizing and restating directions that are not clearly stated.	This involves: – following a pattern and comprehending its general intent and significance; – determining the meaning of words and illustrations not immediately understood, through the interpretation of contextual clues.
5. Identifying the purpose of the material	This involves: – determining the author's purpose by surveying the table of contents, chapter headings, fly-leaf, preface, foreword, etc.; – determining the author's purpose by skimming selectively; – recognizing dialogue, contrast, flashback, and other literary techniques; – relating all of the above techniques to the purpose of the author; – selecting material appropriate to the level of the student's development; – determining, while keeping the author's purpose in mind, whether the material: a) can be used in its entirety or in part; b) is more suitable for another student; c) can be developed as an expression of a particular theme.	This involves: – determining the producer's purpose by surveying annotations in catalogues; – determining the producer's purpose by previewing the material.
6. Recognizing bias	This involves recognizing bias by observing: – the author's choice of words (e.g., the use of value-charged words); – the choice of style (e.g., the use of sarcasm or humour); – the emphasis put on a particular point (e.g., the amount of space given to it); – the kinds of illustrations used; – the use of propaganda techniques; – the use of stereotypes; – significant omissions.	This involves recognizing bias by observing: – the choice of words (e.g., the use of value-charged words); – the choice of style (e.g., the use of sarcasm); – the amount of "air time" given to a topic; – the relative size of figures on the screen; – the camera angles used and the composition of shots; – the inflection and tone of voice used; – the use of credits; – significant omissions.

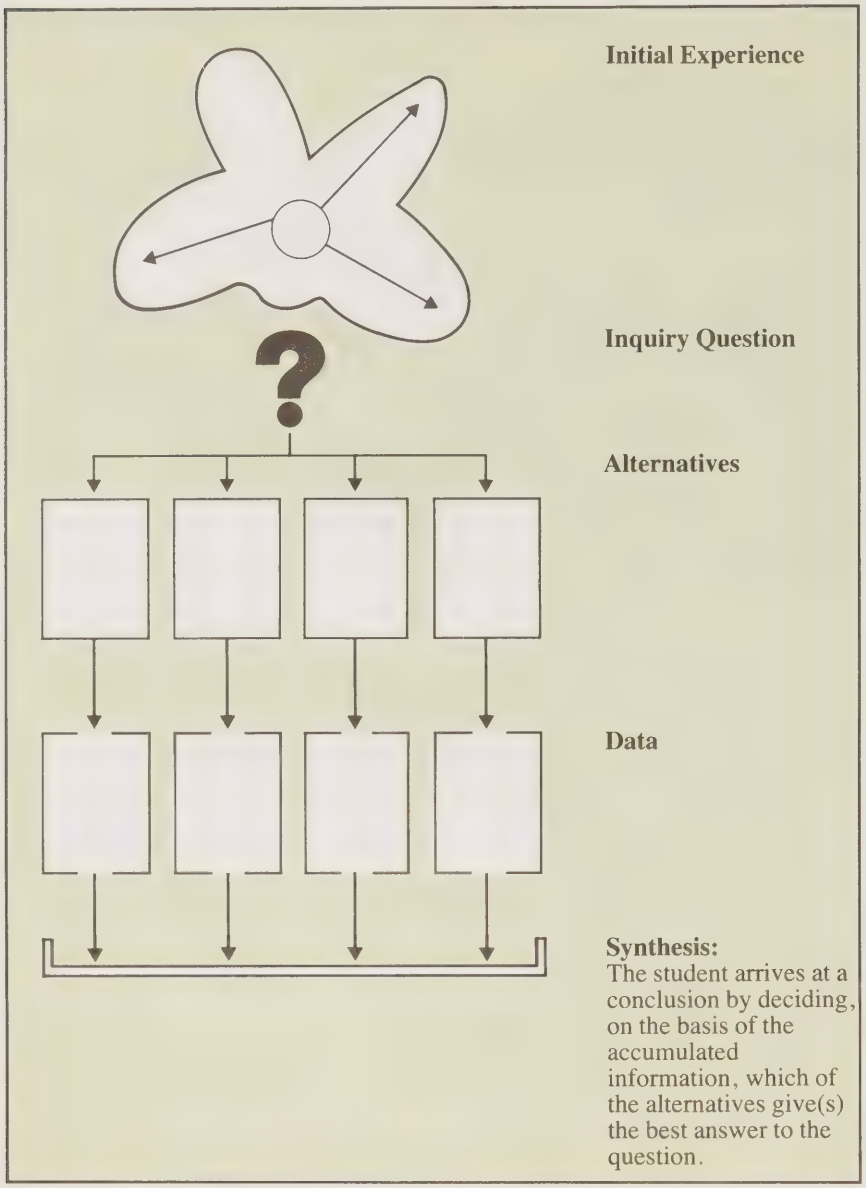
Objective Representations – Charts, Maps, Graphs, Tables, etc.	Listening – Interviews, etc.	Observing – Objects, Actions, Field Trips, etc.
This involves: – recognizing that each section has a main idea; – recognizing indicators of the main idea (i.e., title, labels, etc.); – selecting the main idea from the material.	This involves: – recognizing that each segment has a main idea; – noting the pace, stress, and volume of the subject's speech, as well as gestures and body language; – recognizing the significance of these elements; – selecting the main idea from the material heard.	This involves: – recognizing that a principal idea can be gained from each section of the field trip, or each object observed; – recognizing the significance of such things as the location and surroundings of, changes in, and the shape of the object or action observed; – selecting the main idea from the material or experience.
This involves applying efficient chart- and map-interpretation skills to extract the relevant details from the material.	This involves applying efficient listening and/or interviewing skills to extract the relevant details from the subject.	This involves applying efficient observation skills to identify the most relevant aspects of the object or action.
This involves: – locating events and personalities in time; judging the significance of change and the passage of time; – placing events in sequence; – describing relationships among places and among personalities, time, places, and events; – identifying relationships among places and among personalities, time, places, and events; – identifying relationships of cause and effect among events or spatial phenomena; – identifying the relationship of the whole to the parts, the parts to each other, and the parts to the whole; – identifying relationships among objects, etc., in spatial arrangements; – identifying the effect of spatial context in the perception of an object.		
This involves: – following a pattern and comprehending its general intent and significance; – determining the meaning of symbols and words used in a diagram.	This involves: – listening to all directions and comprehending their general intention and significance; – determining the meaning of words not immediately understood, through the recognition of contextual clues and by questioning the speaker.	This involves: – comprehending the purpose and significance of all directional signs; – determining the meaning of words and symbols on directional signs.
This involves determining the author's purpose by surveying titles, scope, legends, etc.	This involves determining the speaker's intention by noting introductions, titles, etc.	This involves: – surveying the context of a site to determine the logic of its arrangement; – planning and using maps and directories.
This involves recognizing bias by observing: – the choice of symbols; – the use of colour; – scale; – the size of the figures; – distortions in statistics and projections; – the selection of items; – significant omissions.	This involves recognizing bias by observing: – the choice of words (e.g., the use of value-charged words); – the choice of style (e.g., the use of sarcasm or humour); – the amount of "air time" given to a topic; – the use of tone and inflection; – the choice of interviewee; – the choice of questions; – significant omissions.	This involves recognizing bias by observing: – the choice of words used; – the choice of style (e.g., the use of sarcasm or humour); – the choice of activity; – the position of the observer; – the choice of route; – the fairness of the sample.

Data-Collection Chart (cont.)

Basic Skills	Reading – Books, Magazines, Newspapers, Pamphlets, etc.	Viewing – Films, Videotapes, Slides, etc.
7. Using different sources of information	This involves: – collecting data from more than one source and from secondary sources; – recognizing several secondary sources as having a common primary source; – determining the relative value of the source material; – recognizing the existence of differing viewpoints.	
8. Translating figurative language and identifying the reasons for its use	This involves: – identifying figurative language (metaphors, similes, etc.); – translating figurative language into plain language; – assessing the effectiveness of figures of speech.	This involves: – identifying visual language and symbolism; – identifying and explaining allusions; – assessing the effectiveness of visual language and symbolism.
9. Differentiating between fact and fiction, and identifying distortion and opinion	This involves: – identifying types of writing: travel, biography, etc.; – reading and assessing the evidence presented; – evaluating the author's consistency within his/her work; – relating external evidence to the written material; – assessing the credentials of the author to determine the extent of his/her authority on the subject.	This involves: – identifying types of films: biography, documentary, etc.; – viewing and assessing the ideas presented; – distinguishing between the effect of the presentation of the ideas and the validity of their argument.
10. Assessing the author	This involves: – assessing the author's ability and qualifications in his/her subject; – using the fly-leaf and dust-jacket information and the foreword to evaluate the author's authority; – determining whether the author's qualifications are appropriate to the research project undertaken.	This involves determining the producer's expertise by consulting résumés.
11. Making inferences and judgements, drawing conclusions, making predictions a) by basing judgements on the best information available b) by basing judgements on information from more than one source c) by reconciling differences among sources	This involves: – suspending judgement until the final presentation has been completed; – interpreting the author's motives; – recognizing the strengths and weaknesses in the author's logic; – distinguishing between relevant and irrelevant information; – combining information from a variety of sources; – noting elements and omissions that various sources have in common; – testing data collected against the original question; – classifying data under headings or in categories; – examining and analysing contradictions and inconsistencies; – inferring details that are implied but not stated; – making predictions of the results of the issues researched; – questioning the validity of generalizations; – recognizing the importance of the date of source material.	

Objective Representations – Charts, Maps, Graphs, Tables, etc.	Listening – Interviews, etc.	Observing – Objects, Actions, Field Trips, etc.
This involves: – collecting data from more than one source and from secondary sources; – recognizing several secondary sources as having a common primary source; – determining the relative value of the source material; – recognizing the existence of differing viewpoints.		
	This involves: – identifying figurative language (metaphors, similes, etc.); – translating figurative language into plain language; – assessing the effectiveness of figures of speech.	
This involves: – identifying types of graphs and charts, etc.; – assessing the information presented; – noting the scale of interpretation.	This involves: – identifying genres – travel, biography, etc.; – assessing the material; – relating additional, external information to the material.	This involves: – identifying types of objects and activities; – assessing the adequacy of the sample; – employing devices (e.g., time lapse, slow motion, the microscope) for greater accuracy and more effective observation.
This involves determining the author's expertise by judging the type of publication in which his/her work appears, and its position in the publication.	This involves using the information given in the biographical introduction to assess the speaker's expertise in his/her field.	This involves assessing the expertise of the guide leading a field trip against available printed information.
This involves: – suspending judgement until the final presentation has been completed; – interpreting the author's motives; – recognizing the strengths and weaknesses in the author's logic; – distinguishing between relevant and irrelevant information; – combining information from a variety of sources; – noting elements and omissions that various sources have in common; – testing data collected against the original question; – classifying data under headings or in categories; – examining and analysing contradictions and inconsistencies; – inferring details that are implied but not stated; – making predictions of the results of the issues researched; – questioning the validity of generalizations; – recognizing the importance of the date of source material.		

The Basic Inquiry Model



Synthesis

In order to form sound conclusions, the researcher must be able to synthesize data effectively. Students should learn:

1. to judge, on the basis of the amassed information, which alternative or alternatives give(s) the best answer to the question. They should then form a conclusion on the basis of this decision. This involves:

a) choosing the alternative that receives the most support from the data (if the answer to the question involves selecting only one alternative);
b) including all pertinent alternatives (if more than one alternative can be correctly included in the answer);
c) indicating the relative importance of each alternative in the statement of the conclusion;

2. to discriminate among alternatives by considering:

a) the quantity of data supporting each alternative;
b) the quality of the supporting data in terms of their relevance and reliability.

The Teacher's Role

Teachers should assist students:

1. to make the best use of their data when discriminating among alternatives;

2. to identify and indicate the relative importance of the different alternatives if more than one is included in the conclusion;

3. to recognize the limitations of their conclusions due to limitations in the data.

Student Skills

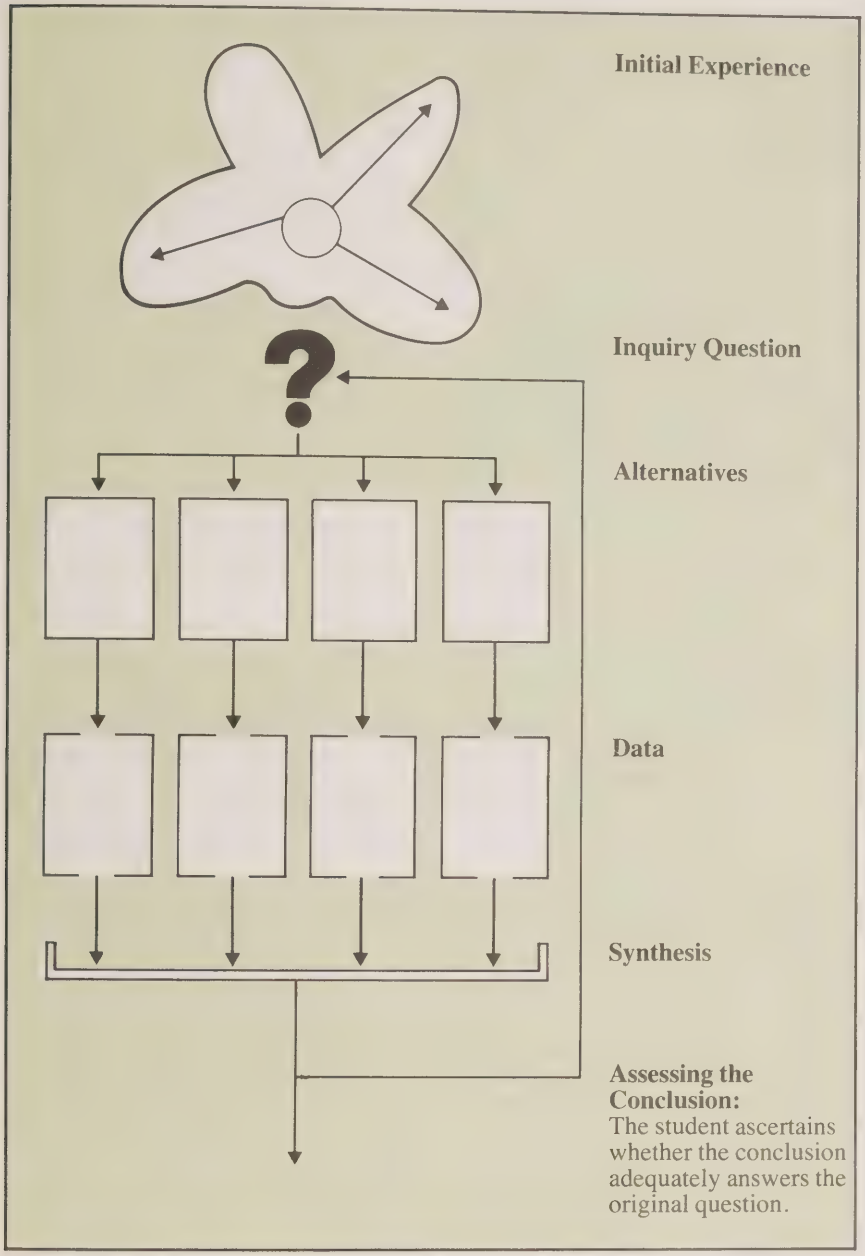
The students should learn:

1. to apply suitable criteria for judging the material in order to arrive at a conclusion. This involves:

a) selecting the alternative best supported by the data;
b) selecting and combining all the alternatives supported by the data;
c) successively eliminating alternatives as negative data emerge;
d) leaving the question without a conclusion if there are insufficient data to support any of the possible solutions;

2. to state the conclusion, indicating the relative importance of the various factors considered and remarking on any limitations to the general application of the conclusion.

The Basic Inquiry Model



Assessing the Conclusion

In assessing the conclusion of their research, students should compare the original question with each section of the conclusion to determine the extent to which their conclusion answers the question.

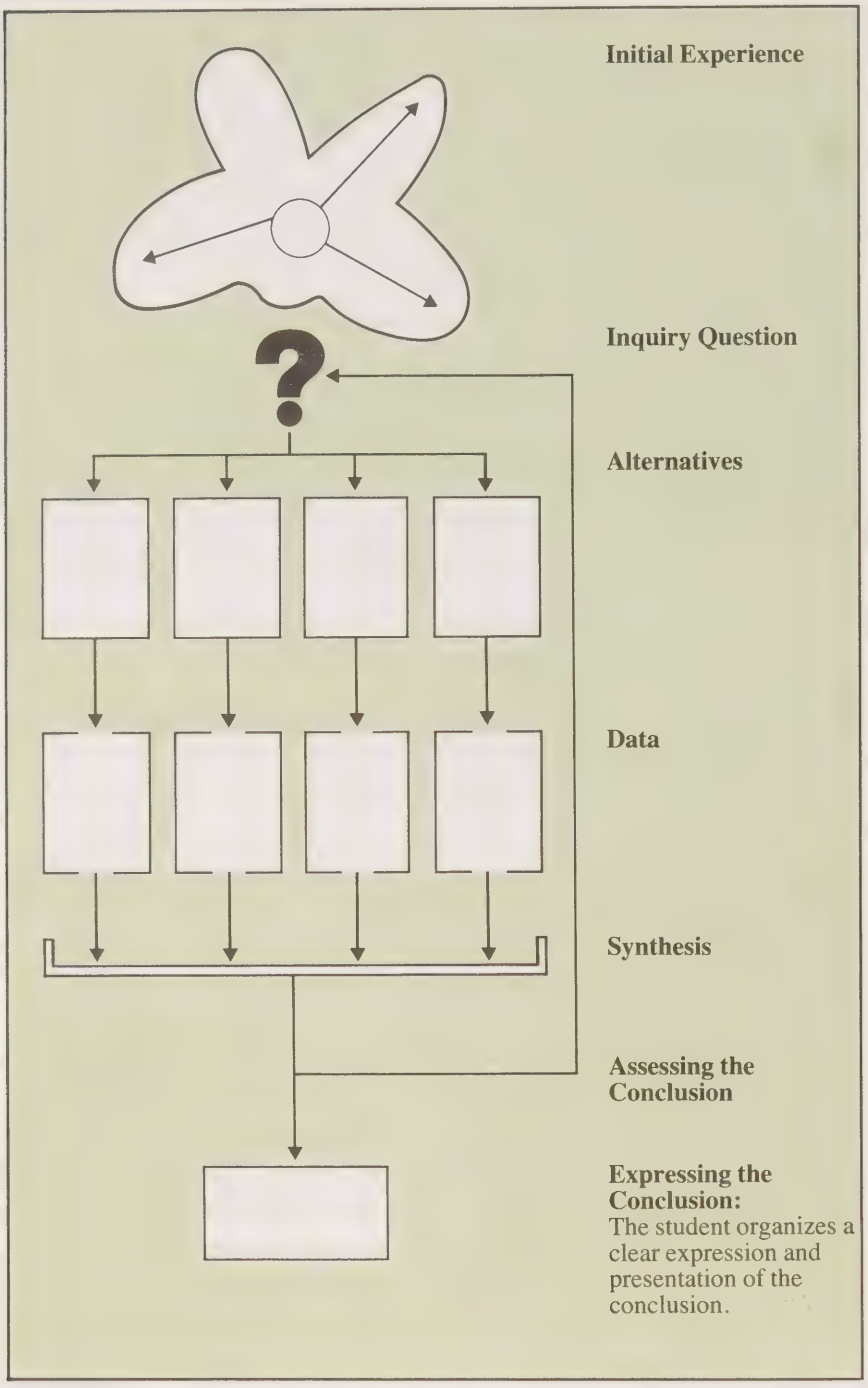
The Teacher's Role

The teacher should assist students to relate each section of the conclusion to the original question.

Student Skills

The students should learn to ascertain whether the conclusion answers the original question.

The Basic Inquiry Model



Expressing the Conclusion

Procedure

The form of the conclusion's final expression should not be decided upon until the following factors have been considered:

1. What type of data is involved? Graphs, charts, and tables are effective in summarizing complex material, provided that they are suited to the nature and purpose of the collected data.

2. What is the intended audience? What is its level of maturity? How familiar is the audience with the topic?

3. What is the purpose of the activity? Frequently, the purpose dictates the form in which the conclusion should be expressed. For example, if the purpose is to illustrate opposing viewpoints on an issue, a class debate among those who researched the different positions would be a suitable form of expression.

4. The expression of the conclusion can combine two or more formats: for example, a written report supplemented by graphs and photographs.

The Teacher's Role

The teacher's task is:

1. to ensure that students have collected all their data before they decide on the final format of their report;

2. to assist students in checking that the collected data answer the original question. Too often, false assumptions are made because students fail to consider all the data, and their conclusions consequently fail to provide viable solutions to the problems;

3. to propose a comprehensive range of possible formats for the expression of the students' conclusions;

4. to assist students in selecting a format appropriate to the material, bearing in mind the time available;

5. to assist students in identifying the nature of the audience. They should consider such factors as the audience's maturity, familiarity with the topic, reading level, etc. These factors should influence the selection of format;

6. to encourage students to consider a variety of reporting formats, ensuring that the students themselves make the final choice.

Student Skills

The students should learn:

1. to organize their expression of the material around the conclusion reached;

2. to decide on the format for their report by considering the following:

a) the purpose of the expression;
b) the nature of the data;
c) the nature of the audience;
d) the time available for research and the time available for communication;

3. to employ a combination of formats if this seems desirable – for example, a slide presentation supplemented by an audio tape.

The criteria for selecting the appropriate form of expression should apply to each of the formats chosen;

4. to construct the presentation with attention to the quality of the performance, recognizing that such care is a courtesy owed to the audience. Neatness, clarity of speech, effective use of colour, and a logical sequence of ideas are among the qualities to strive for in expressing the conclusion;

5. to work towards mastery of an increasing number of the skills listed in the chart on pages 16-17.

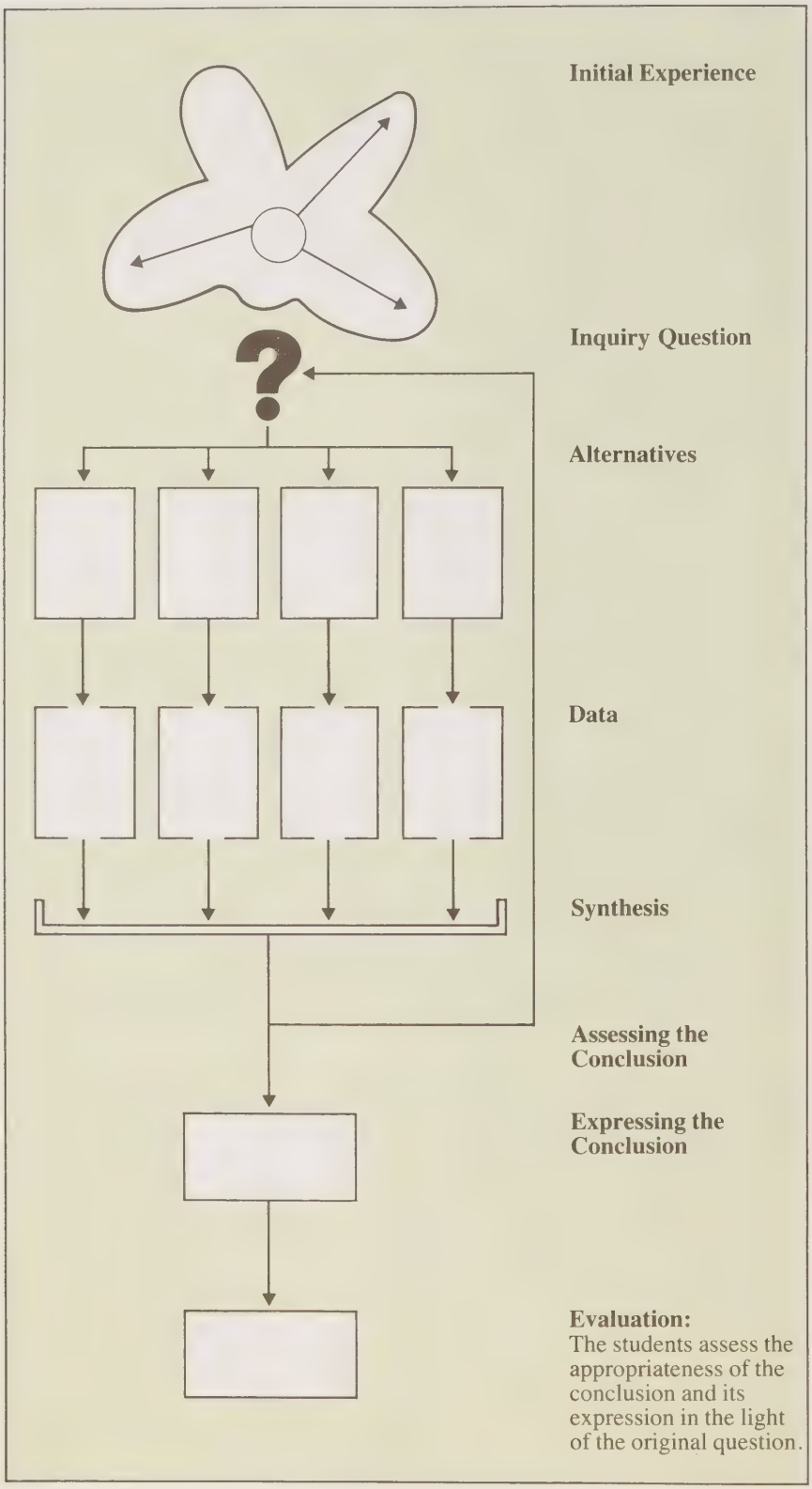
General Skills

1. Justify conclusions using the data collected.
2. Identify patterns and/or cycles in the data.
3. State the limitations in the data that affect the conclusion.

Skills	Cartoons	Illustrations and Models	Dramatization
1. Organize the material by arranging it in categories: a) Select the main idea. b) Select material to support the main idea.	a) Focus on the main idea. b) Avoid extraneous detail.	a) Focus on the main idea. b) Avoid extraneous detail.	a) Make an outline, including main ideas and key details. Put the main ideas together in plot form. b) Select details to support and fill out the plot.
2. Select the form of expression appropriate to: a) the purpose of the inquiry b) the theme c) the audience	Both picture and caption should be appropriate to the message.	The degree of abstraction should be appropriate to the audience's level of understanding.	Decide on the form of dramatization (e.g., drama, musical, role play, mime, movie, simulation, tableau), taking into account interests, abilities, time, and resources.
3. Develop a clear style.	a) Maintain simplicity of layout. b) Use perspective, texture, contrast, line, and mass to support the major idea.	Maintain simplicity of layout.	Expand the plot outline into a script or scenario, adapting the material to the special requirements of the chosen dramatic form.
4. Make appropriate use of special effects.	To enhance impact, make use of: a) understatement b) overstatement c) contrast	Make good use of special effects such as: a) scale b) colour c) lighting	Employ such special effects as: a) scenery b) lighting c) costumes
5. Employ correct methods and conventions.	Does not generally apply.	Does not generally apply.	a) Pay attention to: (i) pronunciation (ii) enunciation (iii) phrasing b) Strive for effective delivery: (i) visual contact (ii) projection (iii) gesture

Written Reports	Abstracts, Précis, Summaries	Oral Reports	Charts and Tables	Graphs	Maps
Make an outline, including only major concepts and key details: a) Select the main idea. b) Select material to support the main idea. c) Arrange the information in a logical sequence. d) Prepare a summarizing statement.	a) Select the main idea. b) Select material to support the main idea.	Make an outline, including only major concepts and key details: a) Select the main idea(s). b) Select material to support the main idea(s). c) Arrange the information in a logical sequence. d) Prepare a summary statement.	a) Select variables: (i) independent (ii) dependent (iii) discrete (iv) continuous b) Describe the multiple membership of any set element. c) Construct a complete cross-classification table employing: (i) real objects (ii) representation objects (iii) diagrammatic representations (iv) numerals d) Invent an appropriate tree diagram to categorize all the data. e) Create categories along given dimensions which produce a convenient cross-classification. f) Note the presence, absence, and/or direction of relationships reflected in cross-classification tables.	a) Select variables. b) Identify variables: (i) independent (ii) dependent (iii) discrete (iv) continuous	a) Focus on the main idea. b) Make a simple sketch and add detail.
Suit the vocabulary and structure of the expression to the audience.	Suit the vocabulary and structure of the expression to the audience.	Suit the vocabulary and structure of the expression to the audience.	The chart or table should suit the audience's level of understanding.	Select the appropriate form: a) pictograph b) bar graph c) line graph d) pie graph	Select an appropriate type of map: a) sketch b) thematic c) choropleth d) topographic
Prepare a final, legible report.	Prepare a concise expression of the main idea.	Make an outline to use as a guide while delivering the report.	Use graphics to increase audience comprehension.	Group data for clarity and convenience.	a) Avoid unnecessary data. b) Group data for clarity.
Make effective use of illustrative examples to clarify points.	Does not generally apply.	Does not generally apply.	Does not generally apply.	Employ an appropriate scale.	Make good use of special effects such as: a) colour b) overlays c) 3-D d) hachures
a) Pay attention to the mechanics of: (i) spelling (ii) sentence structure (iii) paragraphing. b) Employ accepted conventions for: (i) footnotes, (ii) bibliography.	a) Employ correct usage regarding: (i) spelling (ii) sentence structure (iii) paragraphing b) Employ accepted conventions for: (i) footnotes (ii) bibliography	a) Pay attention to: (i) pronunciation (ii) enunciation (iii) sentence structure (iv) phrasing b) Strive for effective delivery: (i) eye contact (ii) projection	a) Select appropriate intervals for data. b) Apply suitable labels. c) Compose a descriptive title indicating units.	a) Assign a dependent variable to the ordinate and an independent variable to the abscissa. b) Select an appropriate scale indicating intervals. c) Apply suitable labels. d) Compose a descriptive title indicating units.	Include the following: a) a title b) a scale c) direction d) a legend e) printed labels

The Basic Inquiry Model



Evaluation

Procedure

Evaluating the Research Procedure
The students should review the research procedure by considering:

a) the difficulties encountered at any of the major stages (i.e., in framing the research question, obtaining information, choosing among alternatives after the information has been gathered, etc.);
b) any techniques or skills that were found to be especially effective;
c) improvements in the procedure to be employed for future research.

Evaluating the Conclusion
The students should:

1. assess the conclusion by examining the care with which the information was selected and evaluated;

2. identify the limitations of the conclusion with respect to:

a) the size of all samples used relative to the population;
b) the range of sources from which the information was gathered;
c) the appropriateness of the data-collection method to the subject matter;
d) the bias inherent in the data-collection procedures.

Using the Conclusion
The students should:

1. distinguish between observation and inference;

2. distinguish between conclusion and hypothesis.

Applying the Conclusion to Other Contexts
The students should consider the following questions:

1. Does the conclusion describe another sample taken from the same population?

2. Can the conclusion be applied to other similar situations?

Evaluating the Expression
The students should:

1. assess the degree to which the final expression clearly conveys the conclusion;

2. assess the suitability of the format, taking into consideration:

a) the purpose of the expression;
b) the nature of the data;
c) the nature of the audience;
d) the time available for research and the time available for communication.

The Teacher's Role
The teacher's task is:

1. to maintain a continuous appraisal of all the research study skills that students employ, in order to decide which skills require special attention (it may be helpful to focus the evaluation on one subgroup of skills at a time);

2. to maintain a positive tone in the evaluation;

3. to facilitate the development of the students' own ability to evaluate, to the point where the amount of teacher direction becomes minimal;

4. to ensure that students evaluate their conclusion before formulating its expression;

5. to ensure that students evaluate the extent to which the conclusion effectively answers the original question.

Student Skills
The students should:

1. examine the conclusion in relation to the original question to ensure that it applies to all parts of the question;

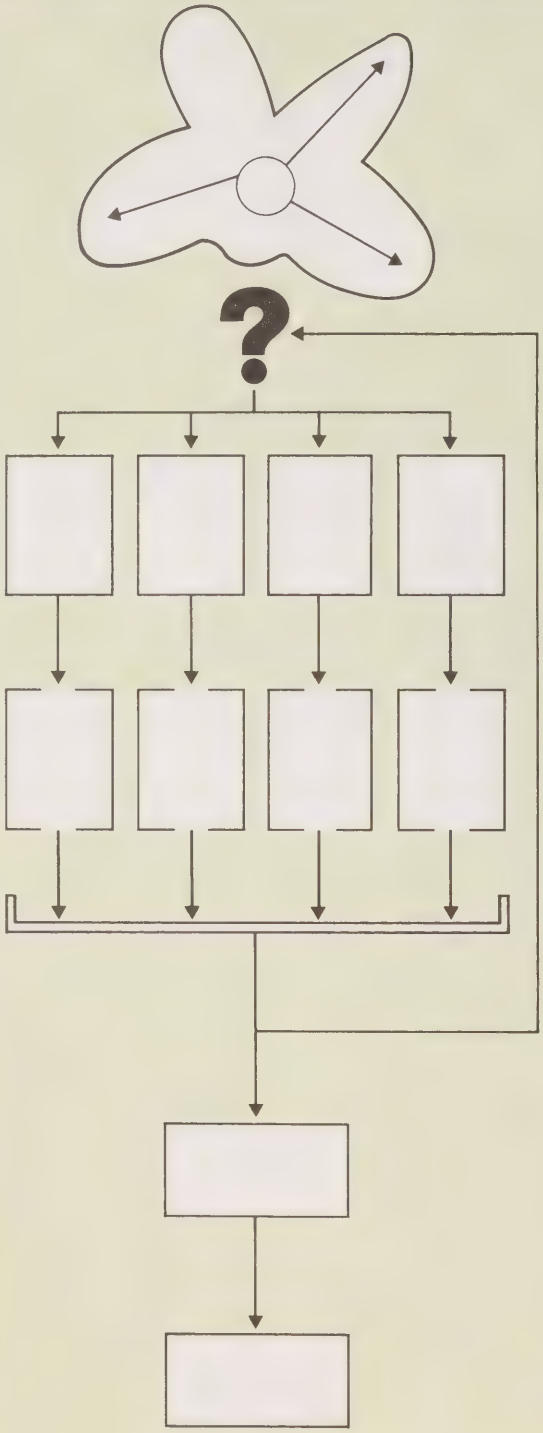
2. examine the limitations of the conclusion with respect to:

a) lack of comprehensiveness of the data;
b) bias in the collection of the data (e.g., sampling);
c) the applicability of the conclusion;
d) the difference between a tentative and a final conclusion;
e) the difference between inference and hypothesis, and observation and conclusion;

3. examine the suitability of the format of the expression with respect to:

a) the purpose of the expression;
b) the nature of the data;
c) the nature of the audience;
d) the time available for research and the time available for communication.

The Basic Inquiry Model



Initial Experience:
Exploratory activities are introduced.

Question:
The student poses a suitable question around which the study will develop.

Alternatives:
The student suggests a range of reasonable alternatives to answer the question. (Additional alternatives may arise in the subsequent data-collection stage.)

Data:
The student collects information on each alternative.

Synthesis:
The student arrives at a conclusion by deciding, on the basis of the accumulated information, which of the alternatives give(s) the best answer to the question.

Assessing the Conclusion:
The student ascertains whether the conclusion adequately answers the original question.

Expressing the Conclusion:
The student organizes a clear expression and presentation of the conclusion.

Evaluation:
The student assesses the appropriateness of the conclusion and its expression in the light of the original question.

An Example of an Inquiry Activity in History

Film of New France

Pictures of the Habitation

Discussion of the location of a new subdivision near the school

Question

Why did Champlain build his Habitation at Quebec?

Alternatives

Defence	Food	Transportation	Climate	Fuel	Water

Data

Cliff Narrows	Forest River Plains	Fur Trade Supplies	Winter	Forest	River

Synthesis

1. There were many natural advantages to the site.
2. The harsh winter climate was a drawback.

Assessing the Conclusion

1. The data *do* tell why the location was a good one.
2. There is no information about personal reasons for the choice of location.

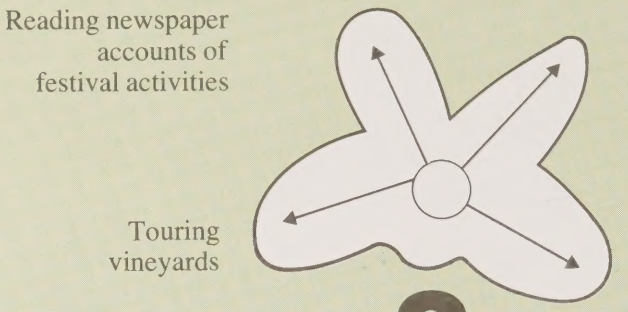
Expressing the Conclusion

The question can be presented through a dramatization, with Champlain and his advisers discussing various locations for the Habitation. The dialogue should bring out the pertinent facts, as researched by the student.

Evaluation

The audience was able to identify the factors constituting the argument after the presentation, but an illustrated map would have been a helpful addition.

An Example of an Inquiry Activity in History (Niagara Regional Grape and Wine Festival)



Question

How has the changing cultural composition of St. Catharines affected public celebrations?

Alternatives

Celebration changes are independent of changes in cultural composition.	Celebration changes correspond to cultural changes.	Celebrations have not changed despite cultural changes.	Neither cultural composition nor celebrations have changed.

Data

Public Celebrations			
Dominion Day	Historical details about public celebrations gathered from interviews with senior citizens, newspaper accounts of the day, photographs, souvenir booklets, printed programs, film accounts, etc.		
Picnics			
Fairs			
Etc.			

Synthesis

Some significant changes in public celebrations are related to changes in the cultural composition of St. Catharines.

Assessing the Conclusion

The Conclusion speaks to the Question.

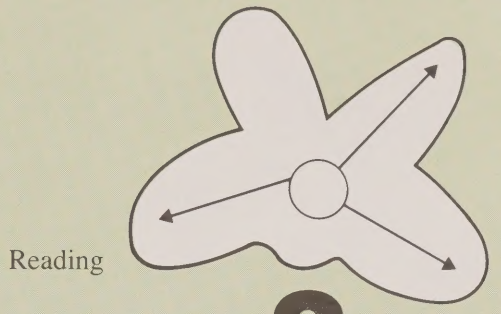
Expressing the Conclusion

A "photograph" album can depict changes in the observance of public celebrations over the years, and can relate the changes to the cultural roots and contributions of the community.

Evaluation

The Evaluation might focus on the varied nature of the sources of data and their accessibility, and also on the extent to which the album reflects the relationship between cultural composition and public celebrations.

An Example of an Inquiry Activity in Geography



Question

Why is the Great Australian Desert so dry?

Alternatives

Latitude	Winds	Mountains	Distance from water	Altitude
20-30° south – an area of desert in the Southern Hemisphere	Southeast tradewinds are blocked by mountains.	Prevent moist winds from reaching area	– touches water on west – 1000-1500 km from water on east	ranges from –10 m to 1200 m

Data

Synthesis

1. Latitude, winds, and mountains seem to affect dryness.
2. Distance from water does not appear to be a factor.
3. The altitude of the desert does not appear to influence its dryness.

Assessing the Conclusion

1. There seems to be a reasonable explanation for the dryness of the area.
2. A simple knowledge of how the factors are related is needed.

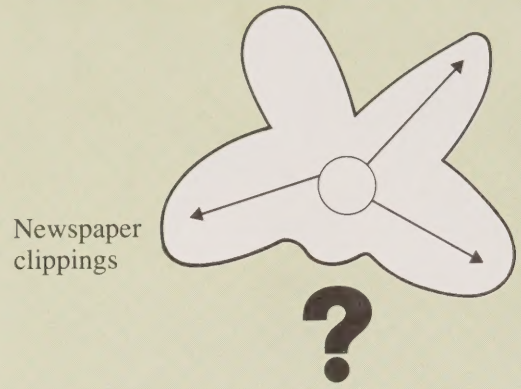
Expressing the Conclusion

A map and a diagram can be used to show how the factors affect the area.

Evaluation

The class was able to verbalize the conclusion by reading the map and diagram.
The class then checked whether the conclusion could be applied to South America, South Africa, and Antarctica.

An Example of an Inquiry Activity in Geography



Question

What forms of energy should Ontario develop?

Alternatives

Thermal | Nuclear | Solar | Wind | Hydro | Biomass | Tidal

Data

Data will be collected for the following four variables for each alternative. The data may be weighted or ranked.

1. cost
2. accessibility
3. renewable resource
4. effect on the environment

Synthesis

Decisions regarding the ranking or weighting of variables involve value judgements; that is, some persons are more concerned about the effects on the environment than about costs. The synthesis should indicate clearly where value judgements are involved.

Assessing the Conclusion

The conclusion will be influenced by the student's values. It could be assessed in terms of present government policy.

Expressing the Conclusion

Charts and pictures can be used. Students can role-play a presentation by individuals or groups who are advocating their positions on the "mix" of energy sources that our society should adopt.

Evaluation

1. Check whether students can express a conclusion different from their own.
2. Show the film *Energy Dilemma* to identify limitations of the conclusion.
3. Have a guest from an environmental group or from the government of Ontario speak to the class so that students can identify the limitations of their conclusion.

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